I CLAIM:

1. A method of treating the surfaces of individual filaments in a multifilament yarn, the method comprising:

(a) immersing the yarn into a liquid treatment solution and coating all exposed surface areas of each individual filament with the treatment solution;

(b) disrupting the orientation of the individual filaments and coating all newly exposed surface areas of each individual filament with the treatment solution; and

(c) repeating step (b) until a predetermined coating level is achieved and withdrawing the yarn from the treatment solution.

2. The method of Claim 1, wherein the liquid treatment solution does not contain a surfactant.

3. The method of Claim 1, further comprising the step of agitating the yarn and the treatment solution to further increase the orientation disruption of the individual filaments and increase the amount of coated surface area.

4. The method of Claim 3, wherein the agitation is produced ultrasonically.

5. The method of Claim 1, further including the step of imparting a predetermined amount of tension on the yarn.

6. A method for the treatment of individual filaments of a multifilament yarn, the method comprising:

(a) pulling the yarn through a continuously filtered recirculation treatment solution reservoir thereby coating the yarn with a treatment solution;

(b) changing the travel direction of the yarn and disrupting the orientation of the individual filaments;

(c) pulling the yarn back through the treatment solution reservoir thereby coating the yarn, and previously uncoated portions of the individual filaments, with treatment solution; and

(d) repeating steps (b) and (c) until a predetermined level of individual filament coating is achieved.

7. The method of Claim 6, wherein the treatment solution does not contain a surfactant.

8. The method of Claim 6, further including the step of agitating the yarn and the treatment solution with an ultrasonic agitation system, in operative communication with the treatment solution reservoir, further increasing the orientation disruption of the individual filaments and the amount of coated surface area.

9. The method of Claim 6, wherein the treatment solution is an acidic solution and the method substantially uniformly etches each individual filament of the yarn.

10. The method of Claim 6, wherein the treatment solution is a palladium salt solution and the method facilitates substantially uniform absorption of a plurality of palladium ions on each of the individual filaments of the yarn.

11. The method of Claim 6, wherein the treatment solution is an alkaline sodium borohydride solution and the method substantially uniformly reduces a plurality of previously deposited palladium ions to form a substantially uniform coating of palladium metal on each of the individual filaments of the yarn.

12. A continuous method for electroless plating of individual filaments of a multifilament yarn, the method comprising:

(a) providing a plurality of processing cells, wherein each processing cell has a treatment solution reservoir containing a predetermined amount of a treatment solution;

(b) feeding the yarn into a first yarn transfer system that guides the ingress and egress of the yarn from an acidic solution and disrupts the orientation of the individual filaments of the yarn to achieve a substantially uniform etching of the exterior surface of each individual filament;

(c) transferring the yarn from the first yarn transfer system to a second yarn transfer system that guides the ingress and egress of the yarn from a bathing solution and disrupts the orientation of the individual filaments of the yarn to remove substantially all of the acidic solution from each individual filament;

(d) transferring the yarn from the second yarn transfer system to a third yarn transfer system that guides the ingress and egress of the yarn from a catalyzing solution and disrupts the

orientation of the individual filaments of the yarn to achieve substantially uniform absorption of a plurality of metal ions on each of the individual filaments;

(e) transferring the yarn from the third yarn transfer system to a fourth yarn transfer system that guides the ingress and egress of the yarn from a reduction solution and disrupts the orientation of the individual filaments of the yarn to facilitate substantially uniform reduction of the plurality of metal ions on each individual filament to form a substantially uniform coating of metal on each of the individual filaments of the yarn; and

(f) transferring the yarn from the fourth yarn transfer system to a fifth yarn transfer system that guides the ingress and egress of the yarn from an electroless bath and disrupts the orientation of the individual filaments of the yarn to facilitate a substantially uniform conductive undercoating on each of the individual filaments of the yarn.

13. The method of Claim 12, wherein the acidic solution, the bathing solution, the catalyzing solution, and the reduction solution are free of surfactants.

14. The method of Claim 12, further including an ultrasonic agitation system, in operative communication with the bathing solution, to agitate the yarn and the bathing solution to further increase the orientation disruption of the individual filaments and increase the amount of surface area contacted by the bathing solution and reducing the amount of residual acidic solution.

15. The method of Claim 12, wherein the multifilament yarn is composed of a plurality of polymeric filaments.

16. The method of Claim 15, wherein the plurality of polymeric filaments is selected from the group consisting of polyacrylnitrile, aromatic-heterocyclic rigid-rod and ladder polymers.

17. The method of Claim 15, wherein the plurality of polymeric filaments are poly(*p*-phenylene terephthalamide) PPTA filaments.

18. The method of Claim 12, wherein the yarn is fed from the first yarn transfer system to the fifth yarn transfer system under varying amounts of predetermined tension.

19. The method of Claim 12, wherein the first, second, third, fourth, and fifth yarn transfer systems operate at a common speed.

20. The method of Claim 12, wherein the catalyzing solution is a palladium salt solution.

21. The method of Claim 12, wherein the reduction solution is an alkaline sodium borohydride solution.

22. An apparatus for the treatment of individual filaments of a multifilament yarn, the apparatus comprising:

a treatment solution reservoir, containing a predetermined amount of liquid treatment solution, having at least one sidewall and a bottom; and

a yarn transfer system configured to feed at least one yarn through the reservoir, having at least one filament orientation disruption assembly configured to guide the yarn through a portion

of the reservoir and disrupt the orientation of the individual filaments thereby exposing previously unexposed surface areas of each individual filament to the treatment solution.

23. The apparatus of Claim 22, wherein the at least one sidewall includes an entry sidewall, formed with an entry weir, an exit sidewall, formed with an exit weir, and wherein the treatment solution is maintained at a solution level above that of the entry weir and the exit weir such that the treatment solution flows from the reservoir through the entry weir and the exit weir, and the entry weir and exit weir are configured such that the yarn repeatedly enters and exits the reservoir through the entry weir and exit weir.

24. The apparatus of Claim 22, wherein the bottom is formed with at least one yarn slot configured so that the treatment solution flows from the reservoir through the at least one yarn slot and the yarn repeatedly enters and exits the reservoir through the at least one yarn slot.

25. The apparatus of Claim 23, wherein at least one filament orientation disruption assembly includes a first filament orientation disruption assembly and a second filament orientation disruption assembly, wherein the first filament orientation disruption assembly includes a first roller, located external to the reservoir and in close proximity to the entry weir, and the second filament orientation disruption assembly includes a second roller, located external to the reservoir and in close proximity to the exit weir, wherein the first roller and the second roller are configured to rotate as the yarn turns about the first roller and the second roller, and configured to guide the yarn through the entry weir, the reservoir, and the exit weir while disrupting the

orientation of the individual filaments thereby exposing previously unexposed surface areas of each individual filament to the treatment solution.

26. The apparatus of Claim 23, further including a collection and filtration system having a collection basin, configured to collect the treatment solution as it exits the entry weir and the exit weir, a filtration assembly to filter the treatment solution collected in the collection basin, and a pump to transfer the filtered treatment solution back into the treatment solution reservoir.

27. The apparatus of Claim 22, further including an ultrasonic agitation system, in operative communication with the treatment solution reservoir, to agitate the yarn and the treatment solution further increasing the orientation disruption of the individual filaments and increasing the exposure of substantially all of the surface area of each individual filament to the treatment solution.

28. The apparatus of Claim 22, wherein the yarn is fed through the apparatus under a predetermined amount of tension.

29. The apparatus of Claim 23, wherein the treatment solution reservoir is configured to facilitate a bottom-to-top and center-to-sides flow pattern to reduce contamination of the treatment solution.

30. An apparatus for the treatment of individual filaments of a multifilament yarn, the apparatus comprising:

a treatment solution reservoir, containing a predetermined amount of liquid treatment solution, having an entry sidewall formed with an entry weir, an exit sidewall formed with an exit weir, and wherein the treatment solution is maintained at a solution level above that of the entry weir and the exit weir such that the treatment solution flows from the reservoir through the entry weir and the exit weir, and the entry weir and exit weir are configured such that the yarn may repeatedly enter and exit the reservoir through the entry weir and exit weir;

a yarn transfer system having a first filament orientation disruption assembly and a second filament orientation disruption assembly, wherein the first filament orientation disruption assembly includes a first roller having a plurality of yarn fingers and the second filament orientation disruption assembly includes a second roller having a plurality of yarn fingers, the first roller and the second roller configured to rotate as the yarn turns about the first roller and the second roller, and configured to guide the yarn through the entry weir, the reservoir, and the exit weir while disrupting the orientation of the individual filaments thereby exposing substantially all of the surface area of each individual filament to the treatment solution prior to final exit from the apparatus; and

a collection and filtration system having a collection basin, configured to collect the treatment solution as it exits the entry weir and the exit weir, a filtration assembly to filter the treatment solution collected in the collection basin, and a pump to transfer the filtered treatment solution back into the treatment solution reservoir.

31. The apparatus of Claim 30, further including an ultrasonic agitation system, in operative communication with the treatment solution reservoir, to agitate the yarn and the treatment solution further increasing the orientation disruption of the individual filaments and increasing

the exposure of substantially all of the surface area of each individual filament to the treatment solution.

32. The apparatus of Claim 30, wherein the yarn is fed through the apparatus under a predetermined amount of tension.

33. The apparatus of Claim 30, wherein the treatment solution reservoir is configured to facilitate a bottom-to-top and center-to-sides flow pattern to reduce contamination of the treatment solution.